

Socioeconomic status and reaction to climate change: Analysis based on data of Amazon.com

Short Paper 2

Xingyun Wu

UCID:12144992

My proposed research topic is socioeconomic status and reaction to climate change. The basic idea is that people with different socioeconomic background would react differently to changes of their circumstances. Climate changes of winter would be a good indicator of changes of circumstances, which would have a direct impact on human's outdoor activities. Nowadays with the development of online shopping, the fluctuation of outdoor activities could have direct impact on online shopping activities, for online shopping could greatly replace outdoor shopping when outdoor activities are restricted. In this case, when climate changes to be colder than usual, people with lower socioeconomic status may behave differently in outdoor and online activities, compared to well-equipped people with higher socioeconomic status. When their outdoor activities are greatly restricted, their online purchase may distinctively increase. Although the decrease of outdoor activities and the increase of online shopping would be happen to people in general in reaction to unusually cold climate, the worse equipped people might get more influenced and thus show distinctive patterns.

This research would use new data and a new research design to analyze the long and widely concerned causal correlation between socioeconomic status and people's reaction to changes of their circumstances. While offline data of the human behavior could be difficult or costly to collect, the new and big data of digital trace, as well as its combination with existing data could help. For this topic, I would combine online data and offline data to help my analysis.

It would use online data of a representative online shopping website and offline data of climate change and regional crime rate. Data of climate and regional crime rate would come from related bureau. And the online shopping website chosen for this research project is Amazon.com, because it is widely used. Although it is not the only online shopping website, many and various people are using it as a complement to outdoor shopping of everyday-use products. This characteristic makes it tightly

correlate with outdoor activities, which makes it enough representative to my research topic.

Amazon.com collects order histories of every purchase, which contains time of purchase, the dollar amount, types of goods purchased, and mailing address. This could be seen as a longitudinal data containing years of observation. The amount of dollar spent and the types of purchased goods of winters of different years would illustrate the outdoor activities and online activities. The mailing address would indicate the residential location of customers, which would be used to combine with offline data of crime rate. Given the fact of residential segregation within cities, this combination of data would help to identify the relative socioeconomic status of the subjects. To maintain the comparability of socioeconomic status and residential location, the subjects should belong to a limited region such that the distribution of residential location could represent the distribution of people with different socioeconomic status. Chicago is suitable for the choice of researched region, because it is among the big cities with clear patterns of residential segregation and crime rate. In addition, the fluctuation of climate in winter among years would have a clear impact on its residents, which would make it easier to detect patterns of residents' behavior.

To analyze the data mentioned as above, I would use counting and natural experiment for the research design. With counting, I would count the total amount of purchased goods as the measurement of consumption ability, and types of purchased goods to verify how the online shopping at Amazon.com is used to as a complement for outdoor shopping. And I would compare these of winters in different years to find people's reaction to climate change. The climate change among winters would be used as a natural experiment. With a full record of previous temperature of winter and previous online shopping orders, I would be able to compare differences in consumption behavior of different socioeconomic status groups. Comparable to other methods such as measuring and matching, these two methods are more suitable to my research design. And compared to traditional method using survey data to address similar research questions, these methods would make good use of the always-on and longitudinal big data. Moreover, using these methods with big data would make it responsive to even slight difference in consumption behavior of different people,

while the natural experiment could help to see people's natural reaction to changes of their circumstances.

However, there are two potential problems of this research design. First, it highly relies on the data of Amazon.com, which would need the cooperation and authorization of Amazon.com. I would convince Amazon.com to work with me, for this research project not only has value for academic research but would also benefit their understanding of customers' behavior. Understanding the pattern of customers' behavior of different region in reaction to climate change would help them predict changes in customers' need in certain neighborhood, thus get prepared. This would help to reduce cost in goods allocation, while raising their reputation in customers. And this is what I plan to convince Amazon.com with and why I think they should work with me.

The privacy of customers is also a serious concern. Order history of the customers would contain very personal information, whose divulgence would cause very serious problems to the customers. To reach principles for ethical research and address concerns of customers and IRB, I would take several steps to avoid the potentially identifiable issue. First, I would ask Amazon.com to anonymize customers' names and apartment number show in their mailing address. Even myself would not get access to the identity that would directly link the subjects and their online shopping behavior, which would prevent identity information divulgence in the first place. Second, I would further anonymize the data by aggregate them into regional data, instead of keeping and using them as individual data. This would not only help address safety concern but also draw a more comprehensive picture.

In conclusion, my research topic is the influence of socioeconomic status on consumption behavior in reaction to climate change, basing on analysis of online shopping data of Amazon.com and offline data of the city of Chicago. This research design would help to understand the causal relation between socioeconomic status and human behavior in reaction to changes in circumstances. I believe this research project is meaningful and would take actions to address concerns from both Amazon.com and its customer.